

MESSRS. GEORGE BELL AND SONS have published a revised re-issue of "Cities and Sights of Spain," by Mrs. Aubrey Le Blond (Mrs. Main). This handbook for tourists is meant as a supplement to the ordinary guide-book, and the information supplied shows that the writer has an intimate first-hand knowledge of the country. The advice as to hotels, expenses, what to do and what not to do, is of just the kind to be of assistance to visitors to Spain, of which country the writer says, "no other part of Europe offers so varied and attractive a field to nearly every type of traveller." The appearance of this re-issue is particularly opportune just now, since astronomers and others will be visiting Spain next year to view the total eclipse of the sun, as the central line of the eclipse runs in a direction N.W. to S.E. across that country. Mrs. Le Blond's book may be commended to those scientific visitors who will have time to visit some of the beauty spots of the land in which their observations will be made.

We have received vol. xxxvi. of the *Transactions and Proceedings* of the New Zealand Institute, which contains details of the work of the year 1903. The transactions are divided into five sections—miscellaneous, zoology, botany, geology, and chemistry and physics. The total number of papers contributed in these subjects reaches fifty. Among the contributions to the miscellaneous section may be mentioned several statistical studies by Prof. H. W. Segar and an exhaustive consideration of Maori marriage customs by Mr. Elsdon Best. The president of the institute, Captain F. W. Hutton, F.R.S., is the largest contributor to the section of zoology. He describes a new fish, two new flies, a new blow-fly from Campbell Island, and has papers on a new Weta from Chatham Islands and on the occurrence of the curlew sandpiper (*Ancylochilus sub-arquatus*) in New Zealand. Prof. Benham writes of a new species of leech (*Hirudo antipodum*) recently discovered in New Zealand, of the Oligochaeta of the New Zealand lakes, and of an apparently new species of *Regalecus* (*R. parkeri*). Prof. Park contributes to the section of geology five papers on different aspects of New Zealand geology. Of the six papers in chemistry and physics, three are the work of Mr. J. S. S. Cooper. The proceedings, which make up the second part of the volume, provide interesting particulars of the year's work of each of the seven scientific societies affiliated to the New Zealand Institute. The volume as a whole demonstrates conclusively that the men of science in New Zealand are doing successfully their part to extend the bounds of natural knowledge.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN DECEMBER:—

- Dec. 1. 10h. 9m. to 12h. 8m. Transit of Jupiter's Sat. III.
 ,, 10h. 22m. Minimum of Algol (β Persei).
 ,, 13h. 56m. to 14h. 8m. Moon occults η Virginis (Mag. 4.0).
 4. 7h. 11m. Minimum of Algol (β Persei).
 8. 13h. 43m. to 15h. 45m. Transit of Jupiter's Sat. III.
 10-12. Epoch of Geminid meteoric shower (Radiant $108^{\circ}+33^{\circ}$).
 11. 12h. 0m. Saturn in conjunction with Moon (Saturn $3^{\circ}28'S.$).
 12. 1h. Juno in conjunction with Moon (Juno $0^{\circ}49'S.$).
 13. 10h. 19m. to 11h. 12m. Moon occults λ Aquarii (Mag. 3.9).
 ,, 21h. 0m. Mercury at greatest elongation ($20^{\circ}30'E.$).
 16. 17h. Jupiter in conjunction with Moon (Jupiter $1^{\circ}47'N.$).
 20. 6h. 1m. to 7h. 4m. Moon occults γ Tauri (Mag. 3.9).
 ,, 11h. 25m. to 11h. 58m. Moon occults θ Tauri (Mag. 3.9).

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- Dec. 20. 12h. 21m. to 13h. 31m. Moon occults BAC 1391 (Mag. 4.9).
 ,, 15h. 19m. to 16h. 12m. Moon occults α Tauri (Mag. 1.1).
 21. 21h. 0m. Uranus in conjunction with Sun.
 24. 8h. 54m. Minimum of Algol (β Persei).
 26. 9h. 2m. to 9h. 13m. Moon occults A Leonis (Mag. 4.6).
 27. 5h. 43m. Minimum of Algol (β Persei).
 ,, 21h. Venus in conjunction with Saturn (Venus $0^{\circ}48'S.$).
 28. 10h. Neptune in opposition to the Sun.
 29. 12h. 0m. Neptune's Satellite at max. elong. west (distance $17''$).

ENCKE'S COMET (1904 b).—No. 3980 of the *Astronomische Nachrichten* contains the results of further observations of Encke's comet.

Prof. Millosevich, observing at the Roman College Observatory at 6h. 26m. 15s. (M.T. Rome) on November 7, determined the position of the comet to be

$$\alpha \text{ (app.)} = 22h. 50m. 39.93s., \delta \text{ (app.)} = +22^{\circ} 19' 20''.1,$$

and recorded the object as an extraordinarily difficult one with the filar micrometer of the 39 cm. equatorial; no nucleus could be definitely seen.

On November 15 Herr Moschick, using the 6-inch telescope of the Königstuhl Observatory, Heidelberg, found the comet to be a very faint and diffuse object with a doubtful nucleus. The position at 13h. 12m. (Königstuhl M.T.) was $\alpha \text{ (app.)} = 22h. 13m. 37.6s., \delta \text{ (app.)} = +18^{\circ} 14' 26''$.

The following is a corrected ephemeris, by M. Kaminsky, given in the November number of the *Observatory*:—

Ephemeris (Berlin Midnight).

1904	R.A.				Dec.
		h.	m.	s.	
Nov. 29	...	21	18	30	+ 10 30
Dec. 3	...	21	3	50	+ 8 9
" 7	...	20	49	20	+ 5 36
" 11	...	20	34	10	+ 3 1
" 15	...	20	16	32	+ 0 17
" 19	...	19	56	38	- 2 58
" 23	...	19	35	12	- 6 31

On the last mentioned date the comet will be a little north of α Aquilæ, and owing to its proximity to the sun in right ascension will be a difficult object to observe.

As pointed out by Dr. Smart, the comet will approach very near to Mercury in January, and it is hoped that an opportunity of testing the mass of Mercury, by observations of the comet after the approach, will therefore be available.

VARIATIONS ON THE MOON'S SURFACE.—In No. 4, vol. liii., of the *Harvard College Observatory Annals* Prof. W. H. Pickering publishes a number of photographs illustrating the changes which take place in the regions about the lunar crater Eratosthenes during the commencement, the duration, and the passing of sunlight on that region of the moon's surface.

There are sixteen figures in all, the longest interval of time between the taking of any two successive figures being 1.6 days, and it is hoped that, by publishing these together with the detailed descriptions by Prof. Pickering which accompany them, the work of other selenographers may be greatly facilitated, by the possession of the knowledge of what to look for.

The mean diameter of the crater of Eratosthenes is 37 miles, that of the floor 28 miles, and measures of the shadows cast indicate that the western wall has a height of 12,000 feet, whilst the indicated height of the eastern wall is something less than 15,000 feet.

As evidence in favour of the vegetal origin of these phenomena, Prof. Pickering suggests that although water could not exist at the low pressures obtaining on the lunar surface, yet it might be retained in the soil by capillary attraction and thence feed the vegetation, which at each return of sunlight would develop and thus cause the changes illustrated in the photographs.

CELESTIAL PHOTOGRAPHY AT HIGH ALTITUDES.—An interesting account of the work performed by Prof. Payne and Dr. H. C. Wilson during their sojourn at Midvale (Montana), illustrated by reproductions of two of the photographs

obtained, is given by the latter observer in No. 8, vol. xii., of *Popular Astronomy*.

The altitude of the observing station was 4790 feet above sea-level, and the results lead Dr. Wilson to the conclusion that the increase in altitude, from Northfield to Midvale, reduced the necessary exposures, other conditions being the same, by about one-half. The two reproductions accompanying the account show excellent photographs of the America nebula and of the region between β and γ Cygni taken with a $2\frac{1}{2}$ inch Darlot lens with exposures of three hours and of two hours respectively.

DISTRIBUTION OF STELLAR SPECTRA.—In No. 1, vol. lvi., of the Harvard College Observatory *Annals* the distribution of stellar spectra, mainly in reference to the Milky Way, is discussed.

The spectra dealt with are those examined by Mrs. Fleming for the Harvard catalogues, and the work is not yet complete, the present publication dealing only with the results already obtained.

The number and proportion of each class of spectra in definite regions of the heavens, as determined from the discussion of 276 plates containing the spectra of 32,197 stars, are given in a series of tables and shown on a number of curves.

The results indicate that the universe consists of two portions, (1) the first-type stars, which occur in all regions, but preponderate in the formation of the Milky Way; (2) the stars having second- or third-type spectra, which show, in general, a uniform distribution over the whole sky.

The proportion of first-type stars increases as fainter objects are included, but with the Orion stars the opposite seems to be the case. Stars with peculiar spectra seem to congregate in the Milky Way, whilst, contrary to expectation, those having spectra of class F appear to be relatively fewer in the galactic regions.

Absorption by Water Vapour in the Infra-Red Solar Spectrum.—An interesting series of experiments has been made at the Smithsonian Astrophysical Laboratory, by Mr. F. E. Fowle, jun., in order to test the correctness of Bouguer's formula for calculating the amount of solar energy received after atmospheric absorption.

The results, so far as they go, show that the selective absorption of water vapour is well represented by Bouguer's formula and seems to depend only on the amount of the absorbent present, that is to say, the amount of the absorption produced by a given quantity of water vapour is the same, whether the radiations pass through a *great* thickness of *small* density or *vice versa*.

The absorption increases as the wave-lengths of the bands increase, and varies from about 10 per cent. near A (0.76μ) to nearly 100 per cent. at about 1.80μ .

No indication of a general water vapour absorption has been found in the region 0.68μ to 2.00μ .

Mr. Fowle's complete results, illustrated by some of the hograms obtained, are published in No. 1, vol. ii., of the quarterly issue of the *Smithsonian Miscellaneous Collections*.

THE SUPPLY OF VALUABLE FURS.

FEW persons, other than those in some way connected with the fur trade of this country, or who have had occasion to make statistical inquiries on the subject, have any conception of its enormous volume and value. Yet every thoughtful observer who strolls along the fashionable shopping streets of the metropolis at this season can scarcely fail to be struck with the number of establishments for the sale of furs and the richness and variety of their contents, or with the great extent that furs are worn by ladies. Any real and comprehensive idea of the magnitude of the trade can, however, only be gained either by attending the great London quarterly fur sales, such as those of Messrs. C. M. Lampson and Co., or by a study of the catalogues and price-lists of such sales. By a perusal of these documents the inquirer will gain some conception of the immense number of skins of the more valuable kinds of fur-bearing animals imported into this country alone; and when the great Continental sales, such as the Leipzig and Nijni-Novgorod fairs, are also taken into consideration, he will marvel where the supply comes from, and wonder that a clean sweep has not long ago been made of the chief fur-producing

species. Nevertheless, the supply of most descriptions of furs seems to be well kept up, and, with the exception of a few species, such as the sea-otter, the beaver in many districts, the West African guereza monkeys, and certain kinds of fur-seal, it does not appear that any of the valuable fur-bearing mammals are in present danger of extermination, or even of becoming unduly scarce. The truth is that we have probably little real conception of the abundance of such creatures in the more remote districts of North America and in the fur-producing countries of northern Asia.

To attempt, within moderate limits, any general account of the mammals which yield the more valuable kinds of furs is impossible, as it would be with the means at our disposal to give a survey of the world's fur trade, and we shall accordingly content ourselves with referring to some of the more striking items in trade circulars for the current year, and with making such notes on certain of the species there mentioned as may seem desirable. Here it may be recalled that there appeared in 1892 a valuable and interesting work on "Fur-Bearing Animals" by Mr. Henry Poland. This work, needless to say, is now altogether out of date, and it is much to be hoped that the author could see his way to the issue of a new edition, especially, if we may say so without offence, if he would seek the assistance of a professed naturalist in the revision.

We commence our brief review of the more interesting items in the 1903-4 sale-lists by referring to some of the most valuable descriptions of furs employed as articles of dress or as carriage rugs, a large proportion of which are yielded by the Carnivora, and especially by members of the family Mustelidæ. One of the foremost places in this respect is occupied by the sea-otter (*Latax lutris*), an animal which formerly abounded on the coasts of Kamchatka and the Aleutian Islands, but which now stands in imminent jeopardy of extermination unless prompt measures are taken for its protection. Between the years 1772 and 1774 some 10,000 skins of this species were taken in the Aleutians, while at the end of the eighteenth century the annual take was 120,000 in certain newly discovered haunts in Alaska. This number, however, soon fell to 15,000, and when Alaska was ceded to the United States it had sunk to 700. A temporary improvement then took place, but in 1901 the number had fallen to 406. In 1903 Messrs. Lampson sold 463 skins, but they had none to offer in January, 1904, and there are none down in their October list, the latter deficiency being perhaps due to the recent loss of a whole cargo of furs from the Kommandorski Islands and Kamchatka. Of late years 100*l.* is no uncommon price for a sea-otter pelt, while from 200*l.* to 300*l.*, and even, it is said, 500*l.*, have been paid for unusually fine skins.

These prices are, however, paralleled by those given for American silver or black fox (*Canis vulpes argentatus*). Nowadays the trade distinguishes the pure black from the silver or white-tipped skins. Black skins are said to have been sold in St. Petersburg at from 300*l.* to 800*l.* each. In London a pair of silver skins realised 480*l.* and an inferior pair 200*l.* in 1902, but single skins are reported to have fetched 200*l.* Messrs. Lampson offered 670 skins of this fox in 1903, and have 55 in their current October list. The white and blue phases of the Arctic fox (*Canis lagopus*), which are the winter dress of different animals, although often regarded as the winter and summer coats of the same form, have of late years become very fashionable. Of the former 20,341, and of the latter 3685, were sold by Messrs. Lampson last year, but none of the blue variety appear in this autumn's catalogue, against 57 in October, 1903, and it would accordingly seem that the demand is telling on the supply. White fox skins, which some years ago sold for between 2*s.* 6*d.* and 1*s.* 5*s.* each, have recently risen to from three to five guineas, although they are now declining; on the other hand, blue fox, which has long fetched from ten to fifteen guineas per skin, appears to be rising in value. Both white and blue fox come from the northern parts of both hemispheres; the blue should be a pure bluish French grey.

Of lynx skins 5828 were sold by Messrs. Lampson in 1903, and 6316 were offered this autumn, the catalogue prices ranging between 2*s.* and 4*s.* for good samples. Probably most of these skins belong to the circumpolar *Felis lynx*, although they may include some of the American *F. rufa*.